

WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device, said method comprising the steps of:

introducing a catalytic element for promoting crystallization of an amorphous semiconductor film into at least a portion of the amorphous semiconductor film;

converting the portion of the amorphous semiconductor film by a first heat treatment into a crystalline semiconductor film;

selectively adding an element selected from group 15 into an additional region of the crystalline semiconductor film;

gettering the catalytic element into the additional region from an adjacent region to the additional region by a second heat treatment;

forming an active layer by patterning the crystalline semiconductor film;

forming an insulating film covering the active layer; and

carrying out a third heat treatment in an oxidizing atmosphere after forming the insulating film.

2. A method according to claim 1, wherein the catalytic element is at least one selected from the group consisting of Ni, Co, Fe, Pd, Pt, Cu, Au, Ge, and Pb.

3. A method according to claim 1, wherein the element selected from group 15 is one selected from the group consisting of phosphorus, arsenic, and antimony.

4. A method according to claim 1, wherein the element selected from group 15 has a concentration of  $1 \times 10^{19}$  to  $1 \times 10^{21}$  atoms/cm<sup>3</sup> in said additional region.

5. A method of manufacturing a semiconductor device, said method comprising the steps of:

introducing a catalytic element for promoting crystallization of an amorphous semiconductor film into the amorphous semiconductor film;

converting the amorphous semiconductor film into a crystalline semiconductor film by a first heat treatment;

selectively adding an element selected from group 15 into an additional region of the crystalline semiconductor film;

gettering the catalytic element into said additional region from an adjacent region to the additional region;

forming an active layer by patterning the crystalline semiconductor film;

forming an insulating film covering the active layer; and

carrying out a third heat treatment in an oxidizing atmosphere after forming the insulating film.

6. A method according to claim 5, wherein the catalytic element is at least one selected from the group consisting of Ni, Co, Fe, Pd, Pt, Cu, Au, Ge, and Pb.

7. A method according to claim 5, wherein the element selected from group 15 is one selected from the group consisting of phosphorus, arsenic, and antimony.

8. A method according to claim 5, wherein the element selected from group 15 has a concentration of  $1 \times 10^{19}$  to  $1 \times 10^{21}$  atoms/cm<sup>3</sup> in said additional region.